Illawarra Regional Business Park
78 Tongarra Road, Albion Park

Proposed Business Park Subdivision – Concept Plan

Waterways & Wetlands Report

May 2007

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PART A INTRODUCTION & INFORMATION BASE

1 INTRODUCTION

1.1 Background

A substantial business park is proposed on lands to the immediate west of the Illawarra Regional Airfield at Albion Park, south of Sydney in the Illawarra Region. The subject site is known as Lot B in DP 109816 and Lot 6 in DP 1100435 Tongarra Road, Albion Park, and occupies a total area of 74ha (Figure 1).

The proposed subdivision and development of the site is the subject of consideration pursuant to part 3A of the *Environmental Planning & Assessment Act 1979* (EP&A Act). The *Concept Plan* to which this *Wetlands & Waterways Report* is attached has been prepared by reference to the Director-General's Requirements (DGRs) provided by the Department of Planning (DoP) for the project in November 2006.

1.2 Proposed Development

The proposed development for the subject site at 78 Tongarra Road, Albion Park is for the creation of a 47.4ha Business Park on farmlands which are currently grazed adjacent to the Illawarra Regional Airport at Albion Park. The proposed development also includes the rehabilitation and re-establishment of a substantial riparian zone and habitat corridor along Frazers Creek (including the major wetland on the subject site) within the *Environmental Management Zone* (EMZ), occupying a total of 21.5ha of land (Figure 2; see *Flora & Fauna Assessment Report*).

The proposal will require earthworks to be undertaken over a substantial proportion of the site to remove material from the more elevated areas and place it elsewhere on the site to provide flood-free land for the subsequent development activities. The earthworks will ultimately cover approximately 43.53% of the subject site at Albion Park, including the relocation of a portion of Frazers Creek (in the southern parts of the site). That activity will be the subject of consideration by the Department of Environment & Climate Change[1] (DECC), and the provision of a *Part 3A Permit* pursuant to the *Rivers & Foreshores Improvement Act 1948* (RFI Act).

Subsequent development of the site will involve the construction of an access road and the installation of services, and the subsequent construction of industrial or commercial premises on a total of 61 lots. As noted above, the project also involves the implementation of an extensive riparian and wetland regeneration program (in the Riparian 'Buffer' area) over approximately 15.43ha along Frazers Creek and within the wetlands on the site.

Following approval of the *Concept Plan* for the project, development of the site would be undertaken in four stages:

- Stages 1 and 2 - the conduct of earthworks and the placement of fill material on the development area south of the airport, the installation of services and the initiation of riparian rehabilitation works;

[1] The DECC incorporates the relevant part of the previous Department of Natural Resources (DNR).

- Stage 3 - construction of the first part of the road and the initial industrial lots in the southeastern part of the site;
- Stage 4 - construction of the remainder of the Business Park development south of the Illawarra Regional Airport; and
- Stage 5 - construction of the final parts of the Business Park development north of the east-west runway of the Illawarra Regional Airport.

Protection and enhancement of the riparian 'buffers' and wetlands through the western parts of the subject site (within the designated *Environmental Management Area* - EMA) will be undertaken from the initiation of Stage 1 of the project. Importantly, the Stage 1 works (and any subsequent works) will be undertaken in a manner which avoids adverse impacts upon the Riparian Buffer and wetlands.

1.3 Scope of this Report

This *Wetlands & Waterways Report* is designed *inter alia*:

- to provide details of the waterways and wetlands on the subject site, including the SEPP 14 wetland in the southern central parts of the site;
- to address the specific statutory issues relating to the *Rivers & Foreshores Improvement Act 1948* (RFI Act);
- to provide details of the justification for the riparian 'buffers' and rehabilitation areas on the subject site; and
- to address the relevant issues raised in the DGRs for the proposed development including:
  - *State Environmental Planning Policy No. 14 – Coastal Wetlands* (SEPP 14);
  - the NSW *Rivers & Estuaries Policy*;
  - the *Lake Illawarra Estuary Management Study & Strategic Plan*.

2 INFORMATION BASE

Information regarding the waterways and wetlands on the subject site has been obtained from a variety of investigations and sources including:

- inspections of recent aerial photography;
- review of the Department of Planning maps for SEPP 14 Wetlands;
- Information contained in vegetation mapping of the locality by Shellharbour Council;
- field inspections of the subject site undertaken by the author of this *Report* on four occasions (in late 2006 and 2007);
- dedicated flora and fauna surveys of the subject site (Whelans InSites 2007); and
- site inspections in the company of personnel from the DoP and the DECC.

3 EXISTING ENVIRONMENT

The subject site at Tongarra Road, Albion Park has long been used for agricultural and horticultural purposes. Most of the land has been cleared and grazed over a long period, and there is evidence of horticultural or pasture improvement activities at a number of locations on the site (Figure 3).

The site is gently undulating in nature, sloping generally away (to the north, west and south) from the Illawarra Regional Airport at Albion Park. There is a small elevated rise in the southeastern part of the subject site, but approximately half of the site (most of the western parts) are located below the 1:100 year flood line.

Frazers Creek flows in a northerly direction through the western parts of the subject site, leaving and then re-entering the site in the southwest (Figure 3). Most of Frazers Creek has only a sparse and highly modified riparian vegetation cover, as a result of the long established agricultural activities on the subject site. There are small stands of she-oaks along parts of the Creek, although most consist of isolated large specimens some of which (at the end of the airport runway) are regularly lopped.

Substantial parts of the Frazers Creek channel have been either artificially constructed or substantially modified in the past, as indicated by the straight lines of several of the channels (particularly in the northern half of the subject site). In addition, there are mounds of earth at the edge of the Frazers Creek channel at various locations on the subject site, indicating the use of excavators to deepen and possibly straighten the original natural channel.

The subject site supports two wetlands which have both been modified by earthworks and by ongoing cattle grazing. The southern wetland (located near the western boundary in the centre of the subject site and immediately southwest of the east-west runway of the airport) has been designated a *Coastal Wetland* (No. 382) pursuant to *State Environmental Planning Policy No. 14 – Coastal Wetlands* (SEPP 14).

A low flow channel has been constructed along the western side of the southern wetland on the subject site, and there is a mound of earth in the centre of the northern wetland. Both wetlands are subjected to regular and significant impacts from cattle grazing and physical disturbance.

The only other native vegetation present on the subject site at Albion Park is a stand of three large fig trees in the centre of the site (adjacent to the east-west runway of the airport) and a stand of Paper Bark in the southeastern corner of the site.

4 FLORA and VEGETATION

The subject site at Albion Park supports five main vegetation types (Figure 3):

- the modified wetland vegetation in the two wetlands in the centre and in the north of the subject site;
- aquatic vegetation and habitats within Frazers Creek and temporarily within the wetlands on the site;
- the modified and artificial riparian vegetation along Frazers Creek (through the western parts of the site);
- the stand of paperbark swamp forest in the southeastern corner of the subject site; and
- the extensive areas of pasture and artificial vegetation through the majority of the site.

Wetland Vegetation

The two wetlands on the subject site support a variety of native and introduced wetland and semi-

aquatic vegetation including sedges, rushes, aquatic and semi-aquatic herbs and introduced weeds.

Both of the wetlands are subjected to substantial grazing pressure and damage from cattle, and previous disturbances, but retain a predominantly native plant cover. The SEPP 14 wetland has an artficial low-flow channel excavated along its western edge and the northern wetland has been the subject of physical disturbance and modification.

Notwithstanding the levels of disturbance or modification in both wetlands, the vegetation present has the characteristics of an "*endangered ecological community*" listed on the *Threatened Species Conservation Act 1995* (TSC Act) as Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (FWCF). It is to be noted that this community includes artificial sites as well as sites which have been highly modified, and is not confined to undisturbed or natural wetland habitats.

Frazers Creek Riparian Vegetation

Most of the riparian 'buffer' along Frazers Creek has been highly modified as a consequence of the agricultural and other activities on the subject site. Most of the original riparian vegetation has been removed, and most (if not all) of that present along Frazers Creek on the subject site has either been planted or has been established following previous clearing of vegetation along the Creek.

As noted above, portions of Frazers Creek are either entirely of artificial construction or have been modified by earthworks. Mounds of earth adjacent to straightened portions of the creek in the south of the site and for its full extent from the central wetland to the northeastern boundary indicate that most of the Creek within the site boundaries has either been straightened to form channels for the dissipation of floodwaters or has been artificially modified for that purpose.

The southern part of Frazers Creek on the subject site supports either pasture grasses, beds of reeds or stands of introduced and native shrub species. Grazing activities occur up to the top of bank of Frazers Creek along most of the subject site, and into the watercourse itself at its southern extremity.

In the northern parts of the subject site, there is a band of she-oaks along both banks of the Creek. Some of these have been artificially planted and those at the end of the east-west runway of the airport are regularly lopped to maintain a safe height for aeroplane activities. There is no natural or undisturbed riparian vegetation along Frazers Creek anywhere on the subject site at Albion Park.

Paperbark Swamp Forest

The small stand of swamp forest in the southeastern corner of the subject site (adjacent to Tongarra Road and the airport) has a canopy exclusively of the White Feather Honeymyrtle *Melaleuca decora*. The trees are of a uniform height and age, and are likely to be regrowth following either previous fire or clearing for agricultural purposes although the trees are mature and have recently flowered.

The understorey contains a mixture of introduced pasture grasses and native herbs and grasses, although it is predominantly of native species. The stand of vegetation is grazed and is surrounded by introduced pasture, developed sites and Tongarra Road.

This vegetation has many of the characteristics of the "*endangered ecological community*" known as Swamp Sclerophyll Forest on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions (SSFCF). There are larger patches of this community to the east (east of the north-south runway of the Illawarra Regional Airport) and to the south, and the stand of vegetation on the subject site is isolated by surrounding cleared or developed lands, Tongarra Road and the airport.

Agricultural Lands

The majority of the subject site consists of introduced pasture and areas which had been previously subjected to horticultural and/or pasture improvement activities. Cattle grazing is still a feature of the subject site, with the farmhouse and farm buildings located in the southern parts of the site near Frazers Creek. There are also some derelict structures located in the central parts of the site (south of

the western extremity of the east-west runway of the airport), along with three large fig trees which are clearly of some considerable age.

There are two other areas of disturbance on the subject site, being the sheds and associated disturbed portions of the site in the southeast (north of the function centre on Tongarra Road) and an area which has been disturbed by excavation and spoil dumping in the southeastern part of the site. The latter area is characterised by weeds and introduced plant species, with piles of rubble, debris and rubbish.

5 FAUNA and FAUNA HABITATS

5.1 Fauna Habitats

The subject site at Tongarra Road, Albion Park, displays four fauna habitat types as represented by the four plant communities present:

- wetlands, which in the case of the subject site are open ephemeral wetlands of sedges, rushes and semi-aquatic plants with no shrub or tree canopy;
- aquatic and riparian habitats along Frazers Creek, which contain some of the same elements as present in the wetlands;
- the small patch of woodland in the southeastern corner of the subject site, which possesses a tree canopy and a low groundcover stratum, but no shrub or midstorey strata; and
- the open pasture and grasslands of the agricultural parts of the subject site.

The farm buildings and structures also provide some limited potential habitat for certain native fauna species, particularly those which are adaptable and capable of using such artificial features (including individuals of a few threatened microchiropteran bats).

The habitat features and resources present on the subject site at Albion Park are common and widespread throughout the general locality, and are typical of the Illawarra region in general. None of the resources or habitat features are particularly restricted or uncommon, and the proposed development of the subject site provides for the retention of and enhancement of substantial areas of suitable habitat for the native fauna which would currently utilise the site.

A total of 26,6ha of the subject site is to be retained (Figure 3), and most of that area (15.43ha) will be rehabilitated and managed for biodiversity conservation purposes.

5.2 Fauna Assemblage

The assemblage of native fauna species which would utilise the subject site at Albion Park and/or which could be present on occasions includes:

- species typical of wetland habitats some of which may also utilise habitats along Frazers Creek and/or the adjoining grasslands;
- species which are typical of watercourses and their riparian habitats;
- a number of species (particularly small birds) which typically utilise the dense canopy of the swamp forest in the southeastern corner of the subject site; and
- species which are typical of open grassland environments.

Most of the native fauna species which do or are likely to utilise the open grasslands, watercourse and riparian habitats, and the swamp woodland on the subject site, are relatively common to abundant, and are able to adapt to the modified and/or artificial environments present on the subject site (and in the vicinity).

Because of the nature of the landscape and vegetation present, few native terrestrial mammals are expected to occur on the subject site at Albion Park, and the array of native reptile species is also likely to be extremely limited. Similarly, fauna typical of forest communities would be present to only a limited extent on the subject site given the small area of woodland present and the isolation of the subject site from surrounding woodland and forest vegetation.

The two wetlands on the subject site provide habitat and resources for a range of native species, particularly wetland and wading bird species, some of which would also utilise portions of Frazers Creek (particularly where there are dense reeds and/or grassy banks). Native fauna species which have typically been recorded in these environments on the subject site at Albion Park include the Spur-winged Plover, Straw-necked Ibis, White-faced Heron, Great Egret, Purple Swamp Hen, Black-winged Stilt, Pectoral Sandpiper and Sharp-tailed Sandpiper.

It is highly likely that a range of other wetland and wading birds would utilise the wetland habitats on the subject site either at appropriate times of the year (for migratory species) or under appropriate conditions and circumstances (*eg* when the wetlands are flooded and there is a substantial body of standing water).

6 STATE ENVIRONMENTAL PLANNING POLICY No. 14 – COASTAL WETLANDS

The aim of *State Environmental Planning Policy No. 14 – Coastal Wetlands* (SEPP 14) "*is to ensure that the coastal wetlands are preserved and protected in the environmental and economic interests of the State*". The *Policy* applies to lands which are identified by black lines on 1:25,000 topographic maps which are maintained by the Department of Planning (DoP).

Other than "*with the consent of the council and the concurrence of the Director*", works including the clearing of land, construction of levies, draining or filling of lands which are identified as SEPP 14 wetlands are not permitted.

The SEPP 14 maps were generated from aerial photograph interpretation and the mapping of the wetlands at a scale of 1:25,000, with only limited ground-truthing. As a consequence, many of the SEPP 14 wetland boundaries do not coincide precisely with actual wetland vegetation or habitats, and there have been a number of amendments to the SEPP 14 wetland boundaries since its inception in 1985.

The Part 3A process pursuant to the EP&A Act allows for modification of SEPP 14 wetland boundaries as part of the approval process. Alternatively, the Department can deal with the potential for impacts on a SEPP 14 Wetland by considering the actual wetland boundaries and the boundaries as mapped in SEPP 14.

The subject site at Tongarra Road, Albion Park contains an SEPP 14 Wetland (No. 382), located in the central part of the site near the western extremity of the east-west runway of the Illawarra Regional Airfield (Figure 1). The wetland is associated with Frazers Creek which flows through the western parts of the subject site, and thence northwards into the Macquarie Rivulet. That latter watercourse discharges into Lake Illawarra at Gerongar Point, along which is located SEPP 14 Wetland No. 381a.

The boundary of the SEPP 14 wetland on the subject site has been overlayed onto a rectified aerial photograph of the subject site (Figure 4). Some differences between the SEPP 14 boundary and the actual wetland boundary were immediately apparent, and were addressed by undertaking a field 'ground-truthing' exercise.

The boundary of the actual wetland has been ground-truthed by the author of this *Report* (Figure 4). The edge of the actual wetland on the subject site at Albion Park was determined by a combination of:

- specific and obvious changes in slope and landform (particularly around the northern parts of the wetland); and
- a change in the dominant groundcover species from sedges and aquatic herbs to pasture grasses.

It should be noted that there are small patches of ground beyond the identified wetland boundary where local fluctuations in ground level leads to some ephemeral localised pooling of water and the appearance of small patches of sedges within the pasture grasses. These isolated patches of vegetation, particularly where they are clearly the result of previous horticultural activities (*eg* around the eastern parts of the wetland) are not included within the wetland boundaries.

Subsequent to the ground-truthing of the wetland and its initial mapping by the author of this *Report*, a field inspection was undertaken with Dr Peter Nelson of the Coastal Branch of the Department of Planning (on the 22nd of March 2007). No further changes to the wetland boundary were deemed necessary as a result of that inspection (Dr P Nelson *pers comm*).

The beneficial effects of the amelioration and environmental management measures to be implemented around the SEPP 14 Wetland are identified in detail in Chapters 9 and 10 of this *Report*.

7 NSW STATE RIVERS & ESTUARIES POLICY

The proposed Business Park at Albion Park, as documented in the *Concept Plan* for the project, will contribute in a significant manner to achieving the objectives of the *NSW State Rivers & Estuaries Policy*.

At present, Frazers Creek (which traverses the subject site at Albion Park on its western side) and the two associated wetlands on the site are in a highly modified and degraded condition. These features of the environment have long been affected by agricultural activities and have been modified by extensive clearing of native vegetation, introduction of pasture grasses and other weed species, and long-term and ongoing cattle grazing.

As a consequence, the natural functions of watercourses and their associated wetlands (including the trapping of nutrients, containment of sediment, protection against erosion and provision of habitat for native biota) have long been compromised both on the subject site and in the landscape generally.

The proposed Business Park at Tongarra Road, Albion Park includes within the development concept a substantial rehabilitation program which concentrates on the riparian lands adjacent to Frazers Creek and the wetlands on the site. That area (which occupies approximately 11.95ha or 16% of the subject site) will be contained within an *Environmental Management Area* (EMA) which is to be rehabilitated according to a *Vegetation Management Plan* (VMP) prepared for the development concept (see Chapters 9 and 10 of this *Report*).

Further, maintenance of the EMA in the long-term is to be guaranteed by the establishment of Section 88B instruments on the Title of each lot to ensure that lot owners within the Business Park contribute in perpetuity to maintenance of the EMA.

8 LAKE ILLAWARRA ESTUARY MANAGEMENT STUDY & STRATEGIC PLAN

The *Lake Illawarra Estuary Management Study & Strategic Plan* (the "*Strategic Plan*") was developed in accordance with Part 4 of the NSW Government's *Estuary Management Program*, as part of the *Estuary Management Policy* (dated 1992). The *State Rivers & Estuary Policy* has been addressed above (in Chapter 7).

The *Lake Illawarra Strategic Plan* (LISP) is to be implemented by the *Lake Illawarra Authority*, and has as its overall aim "*to revive and restore the Lake environment by resolving existing problems so that the Lake can be restored to a healthy aquatic ecosystem and an attractive recreational and tourist resource for the region*".

It is to be noted that the LISP is consistent with the recommendations of the *Healthy Rivers Commission – Inquiry Into Coastal Lakes* (2002) and the *Catchment Action Plan* (CAP) prepared by the Southern Rivers Catchment Management Authority (SREMA), pursuant to the *Catchment Management Authorities Act 2003* (EMA Act).

Lake Illawarra was the subject of an *Estuary Processes Study* and an *Estuary Management Study*, which are documented in the *Lake Illawarra Estuary Management Study & Strategic Plan* document (WBM Oceanics 2006). Those studies identify the processes and impacts on Lake Illawarra, and identify a number of "*key management issues*" which need to be addressed to achieve the objectives of the *Plan*.

Of the 15 "*key management issues*" identified in the LISP, development of the subject site is of relevance with regard to:

- water quality, by virtue of the quality of stormwater which will be discharged from the industrial development both during construction and once it has been completed;
- sedimentation of Lake Illawarra, to which the proposed development could potentially contribute during the earthworks and filling process, unless appropriate measures are implemented; and

- flooding, although the proposed development is unlikely to affect flood circumstances within Lake Illawarra itself because it represents only an extremely minor component of the total input into the Lake.

The LISP subsequently identifies a number of "*estuary management objectives*" which include overall aims and specific objectives for the future management of the lake and its catchment. These are intended to improve circumstances within Lake Illawara and to address the key issues identified above.

8.1 Water Quality

The overall aim with respect to water quality is to "*improve the water quality of the Lake to a standard that protects its ecological, recreational and aesthetic values*".

The specific objectives identified to achieve that aim include *inter alia*:

- WQ-1: reduce impacts of stormwater flows "*by achieving the recommended water quality criteria .. in these discharges*"; and
- WQ-3: to define "'*sustainable' loads from the catchment to the Lake*" to satisfy appropriate water quality criteria. The LISP provides an "*initial set of recommendations in regard to criteria that may contribute to the achievement of sustainable loads*".

Chapter 5.6.1.2 of the LISP identifies water quality objectives that are to "*be applied to all future developments within the catchment of Lake Illawarra*" in relation to "*median wet weather conditions*", including:

- total nitrogen 0.5 mg/L
- total phosphorous 0.05 mg/L
- filterable reactive phosphorous 0.02 mg/L
- total suspended solids 50 mg/L

Those water quality objectives have been addressed in the *Report* on *Stormwater Management & Water Quality Controls* (Costin Rowe 2007) for the Illawarra Regional Business Park development. The stormwater management regime developed as part of the Business Park *Concept Plan* has been designed *inter alia* to achieve those stormwater quality goals.

The use of water quality control features on the individual lots and through the Business Park will ensure that the stormwater discharged under "*median wet weather conditions*" will achieve the objectives of the LISP.

In addition, the LISP identifies two desirable objectives with respect to water quantity discharges, being:

- "*peak flows for all events up to and including the 100 year ARI event are not to exceed those from the existing land use conditions*"; and
- "*wherever possible, total runoff volumes will also not increase*. *This can be achieved via the application of such Water Sensitive Urban Design techniques as stormwater reuse and infiltration/extended storage techniques. It is realised that this objective may be difficult to achieve in many cases*".

Both of those objectives have been taken into account in the design of the proposed industrial development at Albion Park, as documented in the report by Costin Rowe (2007).

8.2 Erosion & Sedimentation

The overall aim in the LISP with respect to erosion and sedimentation is to "*reduce the rate of sedimentation in the Lake to a pre-European level, restore areas of the Lake degraded by excessive sedimentation and minimise further erosion around the Lake*".

The specific objectives identified in the LISP in this regard include *inter alia*:

- ES-1: "*remediate areas within the Lake and its tributaries that are subject to foreshore and bank erosion and minimise susceptibility to future erosion*"; and
- ES-2: *"reduce sediment loads entering the Lake from both rural and urban catchments to pre-European levels*".

The proposed development of the subject site at Albion Park will achieve both of these objectives by virtue of the impact amelioration and environmental management control measures which are incorporated into the construction phase of the development and the future operation of industrial sites within the development. In addition, the substantial enhancement of Frazers Creek and its adjoining riparian lands will contribute to improvements in water quality conditions and flow regimes off the site.

Special attention has been paid to the potential for erosion of portions of Frazers Creek, and the proposal will provide additional filtration to and protection of water quality within the Creek both during earthworks and construction activities and during subsequent use of the site.

8.3 Catchment Inputs (Catchment Management)

The overall aim of this objective is to "*seek to ensure that land usage decisions are made having regard to the quality and amenity of the Lake's environmental and recreational values*".

Of the two specific objectives identified to achieve this aim, the proposed development of the subject site at Albion Park is relevant with respect to:

- CM-2: "*prevent future development from increasing runoff volumes and pollutant loads*".

These matters have been addressed above with respect to water quality and volumes, and the proposed development has incorporated measures which seek to minimise or avoid the discharge of contaminants, pollutants, sediment and excess water into the Lake Illawarra environment.

9 RIVERS & FORESHORES MANAGEMENT ACT 1948

The remaining elements of the *Rivers & Foreshores Management Act 1948* (RFI Act) deal specifically with the undertaking of physical works within 40m of Frazers Creek. The RFI Act requires the provision of a *Part 3A Permit* for works undertaken within that area, and usually the preparation of a *Vegetation Management Plan* (VMP) for the affected portion of the watercourse.

The project includes the straightening of a small part of Frazers Creek in the southern parts of the subject site, and its replacement by a quasi-natural watercourse. That portion of Frazers Creek will be treated in the same way as the existing modified and reconstructed portion of the watercourse within the subject site.

Treatment and management of the relocated portion of Frazers Creek will include:

- a carefully designed excavation and reconstruction program providing a varied and somewhat sinuous channel;
- a complementary program of soil and sediment management and control;
- the creation of a 25m wide riparian 'buffer' on each side of the reconstructed watercourse, similar to that which is to be created elsewhere along Frazers Creek; and
- management and the monitoring of the reconstructed portion of Frazers Creek in accordance with the VMP to ensure the rehabilitation of riparian and aquatic vegetation.

It is to be noted that the reconstructed portion of Frazers Creek will replace a highly modified and artificial part of the watercourse, and that the whole of Frazers Creek within the subject site has been highly modified and will require substantial rehabilitation.

10 CONSERVATION MANAGEMENT AREA & RIPARIAN BUFFERS

The *Environmental Management Area* (EMA) occupies approximately 15.43ha (or 20.9%) of the subject site at Albion Park. Most of the areas which are to be managed in perpetuity for environmental and biodiversity conservation purposes are contained within the EMA, although there are parts of the subject site which are to be managed for those purposes which will be contained within allotments of the Business Park (Figure 2).

The majority of the EMA, as noted above, is to be managed in the long-term for the restoration of natural features of the environment and for biodiversity conservation purposes. Parts of the EMA, however, along the Illawarra Highway, in the Road Reserve and in the southwest of the site are to be retained as grassy meadows, and may potentially be used for agricultural purposes. The remainder of the EMA (11.95ha or 16% of the subject site) is to be utilised and managed primarily for conservation purposes.

Riparian 'buffers' have been designated on the subject site both along Frazers Creek and around the wetlands on the site. The riparian 'buffers' will have a variety of treatments at different locations, dependent on their structure and proposed functions. The different elements of the riparian 'buffers' within the subject site at Albion Park include:

- a 25m wide riparian 'buffer' on each side of Frazers Creek upstream of the SEPP 14 wetland (in the southern part of the subject site). The majority of this portion of Frazers Creek is currently characterised by pasture grasses with a very narrow band of native and introduced shrubs along parts of the Creek;
- a 25m wide riparian 'buffer' around the ground-truthed SEPP 14 boundary. This riparian 'buffer' has two different functions. The 'buffers' adjacent to the Business Park development consist of a 10m band of natural ground adjacent to the wetland and 15m of 'buffer' on the fill batter for the Business Park. Both of these areas are to be rehabilitated using native grasses, sedges and shrub species, but no tree planting will occur in this part of the riparian 'buffer'. On the western side of the ground-truthed SEPP 14 wetland, the riparian 'buffer' and additional lands to the western boundary of the subject site, are to be rehabilitated using a variety of native vegetation types to provide a continual wildlife corridor or habitat corridor along the western side of the subject site; and
- a minimum 40m wide riparian 'buffer' along Frazers Creek from the SEPP 14 wetland to the northeastern boundary of the subject site (although the minor channel immediately north of the wetland will have a 25m 'buffer'). In some places, particularly on the western edge of the northern parts of the Business Park development and on the western side of the site, the riparian 'buffer' will be broader than 40m on the basis that no other use of those lands is practicable. The circumstances permit a broader riparian 'buffer' at some locations, although rehabilitation works on the subject site are limited to the property boundary, and the riparian 'buffer' will therefore be less than 40m wide in some places. Most of the northern riparian 'buffer' is to be planted with a variety of native vegetation types to provide a substantial habitat corridor through the subject site. This approach will substantially enhance the natural environment in this location.

As noted elsewhere in the documentation associated with the *Concept Plan* for the Illawarra Regional Business Park, stormwater discharges generally will be directed within each allotment away from the wetland buffer for treatment prior to discharge at identified points. In very substantial rainstorm events, however, there will be some overland flow from the development allotments into the vegetated buffer. These are only circumstances where there are very high levels of rainfall and stormwater discharge, and overland flows will be filtered through the 25m buffer strip around the wetlands.

The total area occupied by the riparian 'buffers' and habitat corridor revegetation program on the subject site at Albion Park is 11.95ha. The *Vegetation Management Plan* (VMP) for that area (Whelans InSites 2007) details the management regime to be undertaken both during the rehabilitation phase of the Frazers Creek corridor and in the ongoing management program for the rehabilitated portion of the subject site.

Relevant elements of the VMP and the rehabilitation of the habitat corridor along Frazers Creek through the subject site include:

- the replacement of pasture with native grasses and sedges and at specific locations within the corridor with shrubland or open woodland of either casuarinas or White Feather Honeymyrtle;
- planting of all batter slopes from the Business Park with native grasses, sedges and shrubs to provide both a means of protecting the batter slope soils and the adjoining rehabilitated riparian 'buffers' or wetlands; and
- the provision of a walking track through part of the riparian 'buffer' and a small recreation field near the end of the Albion Park airfield (Figure 2).

11 VEGETATION MANAGEMENT PLAN

The substantial rehabilitation program which is incorporated into the Illawarra Regional Business Park project is to be implemented by the application of the *Vegetation Management Plan* (VMP) which has been prepared for the project.

The general aims of the VMP are:

- to provide a plan for the implementation of bushland rehabilitation works on the subject site in order to generate a significant environmental benefit from the project;
- to optimise the long-term viability and health of the native vegetation to be retained and rehabilitated on the subject site;
- to create a substantial element in a habitat corridor along Frazers Creek and its associated wetlands; and
- to address the goals of various relevant planning policies with respect to the natural environment and particularly to watercourses and wetlands.

The specific objectives of the VMP, which derive from the above aims, are:

- to implement the *Vegetation Management Strategy* (the "*Strategy*") outlined in Chapter 3 of the VMP;
- to reduce the abundance and diversity of weed species in the EMA, and to increase the diversity and abundance of native species;
- to control or manage the current threats to the vegetation on the subject site, particularly weed invasion, cattle grazing and physical disturbance;
- to enhance the quality of the fauna habitats within the site, particularly in the wetlands and the riparian 'buffers';
- to contribute to the establishment of a habitat corridor along Frazers Creek; and
- to establish a monitoring and maintenance program to ensure compliance with the measures outlined in the VMP and to monitor the success of the bushland rehabilitation and management on the subject site.

The VMP will be implemented by the application of a *Vegetation Management Strategy* on the subject site at Albion Park which aims:

- to eliminate or control the weeds and introduced pasture plants which currently characterise most of the *Environmental Management Zone* (EMA) on the subject site;
- to control weeds on the site during subsequent occupation and use of the industrial subdivision;
- to rehabilitate existing areas of disturbed agricultural land within the protected portion of the site (the EMA);
- to establish a self-sustaining natural environment within the EMA along Frazers Creek and in the associated wetlands; and

- to provide supplementary habitat for native biota (particularly in the Frazers Creek corridor as envisaged in the *Illawarra Regional Strategy*).

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Figure 1 Location of the subject site at Tongarra Road, Albion Park.

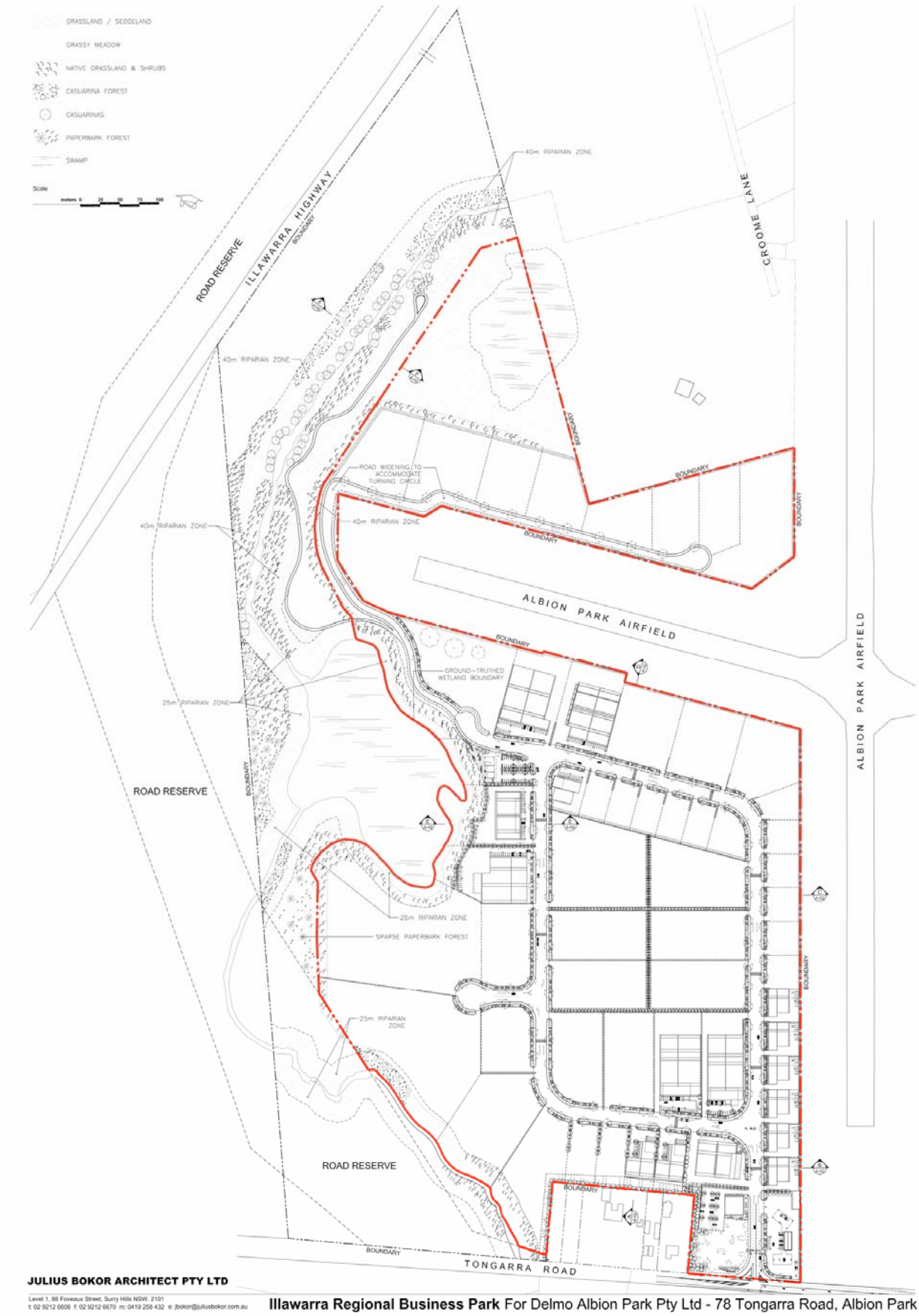

Figure 2 Vegetation management within the *Environmental Management Area* on the subject site at Tongarra Road, Albion Park.

Figure 3 Aerial photograph of the subject site at Tongarra Road, Albion Park.

Figure 4 Aerial photograph of the subject site with the SEPP 14 and the actual wetland boundary on the subject site at Tongarra Road, Albion Park.

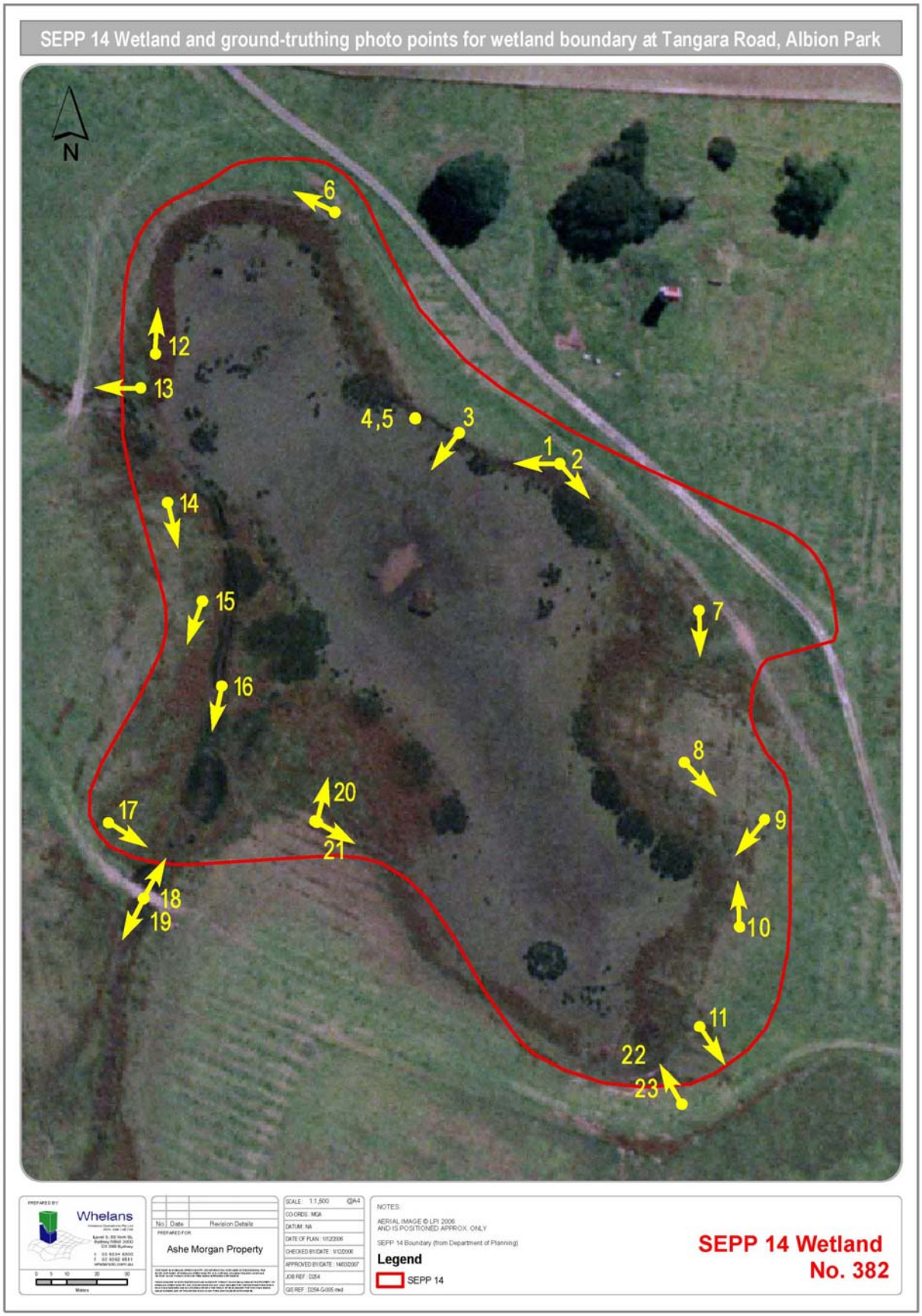

Figure 5 Aerial photograph of the subject site with the SEPP 14 boundary and the photo points used to demonstrate the actual wetland boundary.